This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. **(Currently Amended)** An apparatus that determines allocations in a business operation to maximize profit on a computer system, comprising:

a memory; and

a processor that accesses the memory to retrieve computer-executable instructions to perform:

collecting profit data for a plurality of classes in the business operation, each class including an allocation having a cost function, and each allocation belonging to the group consisting of physical allocations and economic allocations;

determining profit functions for the allocations from the profit data by:

determining demand distributions for the allocations from the profit data; and

determining each profit function from a corresponding demand distribution for a time interval between restocking cycles and a probability that is associated with inventory replenishment;

formulating a Multiple Choice Knapsack Problem to maximize profit from the profit functions, the cost functions, and a cost constraint; and

solving the Multiple Choice Knapsack Problem to determine values for the allocations.

2. **Cancel**

3. **(Previously Presented)** The apparatus according to claim 1, wherein each demand distribution includes a Poisson model.

4. **(Previously Presented)** The apparatus according to claim 1, wherein each demand distribution includes a Markov model.

5. **(Previously Presented)** The apparatus according to claim 1, wherein each demand distribution includes a normal distribution model.

6. **(Previously Presented)** The apparatus according to claim 1, wherein the allocations include spatial allotments.

7. **(Previously Presented)** The apparatus according to claim 1, wherein the allocations include monetary allotments.

8. **(Previously Presented)** The apparatus according to claim 1, wherein the cost constraint is a greater-than-or-equal-to inequality constraint.

9. **(Previously Presented)** The apparatus according to claim 1, wherein the cost constraint is an equality constraint.

10. **(Previously Presented)** The apparatus according to claim 1, wherein the cost constraint is a less-than-or-equal-to inequality constraint.

11. **(Currently Amended)** An apparatus that determines physical allocations in a business operation to maximize profit on a computer system, comprising:

a memory; and

a processor that accesses the memory to retrieve computer-executable instructions to perform:

collecting profit data for a plurality of classes in the business operation. each class including a physical allocation having a cost function;

determining profit functions for the physical allocations from the profit data by:

determining demand distributions for the allocations from the profit data; and

determining each profit function from a corresponding demand distribution for a time interval between restocking cycles and a probability that is associated with inventory replenishment;

formulating a Multiple-Choice Knapsack Problem to maximize profit from the profit functions, the cost functions, and a cost constraint; and

solving the Multiple Choice Knapsack Problem to determine values for the physical allocations.

12. **Cancel**

13. **(Previously Presented)** The apparatus according to claim 11, wherein each demand distribution includes a Poisson model.

14. **(Previously Presented)** The apparatus according to claim 11, wherein each demand distribution includes a Markov model.

15. **(Previously Presented)** The apparatus according to claim 11, wherein each demand distribution includes a normal distribution model.

16. **(Previously Presented)** The apparatus according to claim 11, wherein the physical allocations include spatial allotments for the classes.

17. **(Previously Presented)** The apparatus according to claim 16, wherein the spatial allotments include widths for the classes and the cost constraint is a width constraint.

18. **(Previously Presented)** The apparatus according to claim 16, wherein the spatial allotments include advertising spaces for the classes and the cost constraint is an advertising space constraint.

19. **(Previously Presented)** The apparatus according to claim 16, wherein the spatial allotments include catalog spaces for the classes and the cost constraint is a catalog space constraint.

20. **(Previously Presented)** The apparatus according to claim 16, wherein the spatial allotments include floor spaces for the classes and the cost constraint is a floor space constraint.

21. **(Previously Presented)** The apparatus according to claim 11, wherein the cost constraint is a greater-than-or-equal-to inequality constraint.

22. **(Previously Presented)** The apparatus according to claim 11, wherein the cost constraint is an equality constraint.

23. **(Previously Presented)** The apparatus according to claim 11, wherein the cost constraint is a less-than-or-equal-to inequality constraint.

24. **(Currently Amended)** An apparatus that determines economic allocations in a business operation to maximize profit on a computer system, comprising:

a memory; and

a processor that accesses the memory to retrieve computer-executable instructions to perform:

collecting profit data for a plurality of classes in the business operation, each class including an economic allocation having a cost function;

determining profit functions for the economic allocations from the profit data by:

determining demand distributions for the allocations from the profit data; and

determining each profit function from a corresponding demand distribution for a time interval between restocking cycles and a probability that is associated with inventory replenishment;

formulating a Multiple Choice Knapsack Problem to maximize profit from the profit functions, the cost functions, and a cost constraint; and

solving the Multiple Choice Knapsack Problem to determine values for the economic allocations.

25. **Cancel**

26. **(Previously Presented)** The apparatus according to claim 24, wherein each demand distribution includes a Poisson model.

27. **(Previously Presented)** The apparatus according to claim 24, wherein each demand distribution includes a Markov model.

28. **(Previously Presented)** The apparatus according to claim 24, wherein each demand distribution includes a normal distribution model.

29. **(Previously Presented)** The apparatus according to claim 24, wherein the economic allocations include monetary allotments for the classes.

30. **(Previously Presented)** The apparatus according to claim 29, wherein the cost constraint is a monetary constraint.

31. **(Previously Presented)** The apparatus according to claim 24, wherein the cost constraint is a greater-than-or-equal-to inequality constraint.

32. **(Previously Presented)** The apparatus according to claim 24, wherein the cost constraint is an equality constraint.

33. **(Previously Presented)** The apparatus according to claim 24, wherein the cost constraint is a less-than-or-equal-to inequality constraint.

34. **(Currently Amended)** A system for determining allocations in a business operation to maximize profit, comprising:

a data unit, the data unit having a memory that includes profit data for a plurality of classes in the business operation, each class including an allocation having a cost function that is stored in the memory, and the memory also including a cost constraint;

a profit-model unit, the profit-model unit being connected to the data unit, and the profit-model unit including executable instructions for determining profit functions for the allocations from the profit data, wherein determining the profit functions includes:

determining demand distributions for the allocations from the profit data; and

determining each profit function from a corresponding demand distribution for a time interval between restocking cycles and a probability that is associated with inventory replenishment; and

an optimization-engine-unit, the optimization-engine unit being connected to the data unit and the profit-model unit, the optimization-engine unit including executable instructions for formulating a Multiple Choice Knapsack Problem to maximize profit from the profit functions, the cost functions, and the cost constraint, and for solving the Multiple Choice Knapsack Problem to determine values for the allocations.

35. **Cancel**

36. **(Previously Presented)** A system according to claim 34, wherein each demand distribution includes a Poisson model.

37. **(Previously Presented)** A system according to claim 34, wherein each demand distribution includes a Markov model.

38. **(Previously Presented)** A system according to claim 34, wherein each demand distribution includes a normal distribution model.

39. **(Original)** A system according to claim 34, wherein the allocations include spatial allocations.

40. **(Original)** A system according to claim 34, wherein the allocations include economic allocations.

41. **(Original)** A system according to claim 34, wherein the cost constraint is a greater-than-or-equal-to inequality constraint.

42. **(Original)** A system according to claim 34, wherein the cost constraint is an equality constraint.

43. **(Original)** A system according to claim 34, wherein the cost constraint is a less-than-or-equal-to inequality constraint.

44. **(Currently Amended)** Computer-readable media tangibly embodying a program for determining allocations in a business operation to maximize profit, the program including executable instructions for:

collecting profit data for a plurality of classes in the business operation, each class including an allocation having a cost function;

determining profit functions for the allocations from the profit data by:

determining demand distributions for the allocations from the profit data; and

determining each profit function from a corresponding demand distribution for a time interval between restocking cycles and a probability that is associated with inventory replenishment;

formulating a Multiple Choice Knapsack Problem to maximize profit from the profit functions, the cost functions, and a cost constraint; and

solving the Multiple Choice Knapsack Problem to determine values for the allocations.

45. **Cancel**

46. **(Previously Presented)** Computer-readable media as claimed in claim 44, wherein each demand distribution includes a Poisson model.

47. **(Previously Presented)** Computer-readable media as claimed in claim 44, wherein each demand distribution includes a Markov model.

48. **(Previously Presented)** Computer-readable media as claimed in claim 44, wherein each demand distribution includes a normal distribution model.

49. **(Original)** Computer-readable media as claimed in claim 44, wherein the allocations include physical allocations.

50. **(Original)** Computer-readable media as claimed in claim 44, wherein the allocations include economic allocations.

51. **(Original)** Computer-readable media as claimed in claim 44, wherein the cost constraint is a greater-than-or-equal-to inequality constraint.

52. **(Original)** Computer-readable media as claimed in claim 44, wherein the cost constraint is an equality constraint.

53. **(Original)** Computer-readable media as claimed in claim 44, wherein the cost constraint is a less-than-or-equal-to inequality constraint.

54. **(Currently Amended)** The ~~method~~ apparatus of claim 1, wherein determining demand distributions for the allocations from the profit data comprises:

modeling the demand distributions with corresponding probabilistic functions.

55. **(New)** The apparatus of claim 1, wherein the probability corresponds to finding any number of units of an item on a store shelf.